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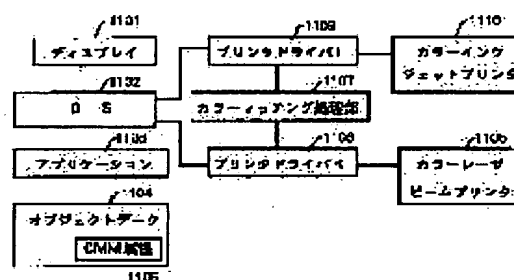
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(54) COLOR INFORMATION PROCESSING METHOD AND DEVICE

(57)Abstract:

PURPOSE: To output data after operating an optimal color matching processing matched with output color reproducing characteristic in an outputting means by adding image attribute information to each image included in color picture information.

CONSTITUTION: In an application 1103 which holds graphic data, a CMM attribute is added to each image as the attribute of a plotting object. The CMM attribute is data for uniquely identifying a color matching algorithm. An OS 1102 checks the CMM attribute added to object data, and selects the optimal matching algorithm. The matching processing by the selected algorithm is operated by a printer driver 1106 or 1109. The printer drivers 1106 and 1109 compensate the color reproducing characteristics of a color laser beam printer 1108 and a color ink jet printer 1110, and operate the matching processing so that the color reproduction of the printers can be matched.



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CLAIMS

[Claim(s)]

[Claim 1] It is the color information processor which can process the color picture information for one screen which consists of two or more images. An attribute information addition means to match the image attribute information relevant to the color property of the image concerned for every image included in the color picture information for said one screen, and to send out, A supply means to supply an output means to output the color picture corresponding to the color picture information for said one screen, the image attribute to which the color picture information image from said attribute information addition means was added by this image -- therefore, the color information processor characterized by having the color matching means corresponding to the color reproduction property in said output means which carries out color matching processing.

[Claim 2] the stroke by which two or more images are consisted of -- the image attribute which added the image attribute information which be the color information processing approach in the color information processor which process and output the color picture information on a region , and be include in said color picture information , and which show the color property of the image concerned for every image , and be added to this image on the occasion of an image output -- therefore , the color information processing approach which characterize by the thing corresponding to the color reproduction property in an output means do for color matching processing .

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the color information processing approach and equipment which make the color picture information outputted to an output unit etc. match with

the reappearance color space of an output unit, concerning the color information processing approach and equipment.

[0002]

[Description of the Prior Art] As shown in drawing 19, only that either which applies predetermined color matching processing (Cmm1) to the whole graphic to output, or is not applied has chosen the color matching processing performed in case the graphical data created by conventional computer etc. is outputted to a printer.

[0003]

[Problem(s) to be Solved by the Invention] However, all the whole does not restrict the image information which it is going to output with the same information, for example, there are two image datas in one graphic, and in one kind of color matching processing, also when it is difficult to reproduce the color of each image data, it is plentifully. The thing which were mentioned above also in such a case and which only one color matching processing (Cmm1) can be performed like, but is acquired for the color reproduction of a wish was conventionally difficult.

[0004] That is, matching processing performs the so-called color space compression in the color range of the inputted color picture, and the color reproduction range of a printer. Therefore, when the color range of two inputted image datas differed and the same color space compression was performed to each image data, even if one image data could carry out color space compression proper, the image data of another side had a possibility of saying that it stops being able to carry out color space compression proper.

[0005]

[Means for Solving the Problem] This invention was made for the purpose of solving an above-mentioned technical problem, and is equipped with the following configurations as a way stage which solves an above-mentioned technical problem. Namely, it is the color information processor which can process the color picture information for one screen which consists of two or more images. An attribute information addition means to match the image attribute information relevant to the color property of the image concerned for every image included in the color picture information for said one screen, and to send out, A supply means to supply an output means to output the color picture corresponding to the color picture information for said one screen, the image attribute to which the color picture information image from said attribute information addition means was added by this image -- therefore, it has the color matching means corresponding to the color reproduction property in said output means which carries out color matching processing.

[0006]

[Function] In the above configuration, the optimal color matching processing corresponding to the output color reproduction property in the output means in the color matching processing facility which it had can be performed and outputted by attaching image attribute information to the data which should be outputted in case it outputs from an output means.

[0007]

[Example] One example which starts this invention with reference to a drawing below is explained to a detail. Drawing 1 is drawing which expresses the description of this invention best, and is drawing explaining color matching for every object of one example of this invention. The conventional processing shown in drawing 18 mentioned above in this invention is drawing showing the condition perform color matching processing in which it was different and it suitable for every image in the data to output, respectively, and as shown in drawing, performing color matching processing shown by Cmm1 to an image 1, and giving the color matching processing shown at Cmm2 in an image 2 is shown.

[0008] The equipment of this example consists of the program memory which memorizes the program of the Mike Leigh processor which performs various control, and this micro FUROSSESA of operation, the data memory which memorizes each output data and the attached display 1101, an interface with printers 1108 and 1110, a printer 1108 connected to this interface, and 1110 grades fundamentally. However, with this configuration, since the description of this example cannot fully express, it supposes that the function performed by the program of the Mike Leigh processor mentioned above and this micro FUROSSESA of operation (attained) is

shown as drawing 2 , and an understanding of invention is made easy. In addition, you may make it software not only to attain each of this configuration, but attain it by hardware.

[0009] The application which performs application control which includes an interface with operators, such as a display whose 1101 displays color graphic information etc., OS by which 1102 controls each function in the gross, creation directions of image information with actual 1103, and I/O directions, in drawing 2 , and 1104 are collectively stored by the CMM attribute 105 which is object data of the graphic drawn by the application 1103 grade, and is mentioned later.

[0010] The color laser beam printer by which the printer driver R in which 1106 manages an interface with the color laser beam printer 1108, and 1108 print out multiple-value information, the printer driver I in which 1109 manages an interface with the color ink jet printer 1110, and 1110 are color ink jet printers which print out binary information.

[0011] The flow of processing of the actual color information on the color matching system (CMS) of this example which processes the print-out over the printer of two kinds of record approaches that the color laser beam printer 1108 in each above configuration differed from the color ink jet printer 1110 is explained below. Drawing 3 is drawing explaining the processing and data flow in the configuration of a more than in this example.

[0012] Color matching explains as an example the case where the chrominance signal from hosts, such as non-illustrated par SONARUKO pewter, is displayed on the screen of the display 1101 of a color through a video board etc. Here, the printer of two kinds of record approaches that the color ink jet printers 1110 which carry out color reproduction to yellow (Y), a Magenta (M), cyanogen (C), and the color laser beam printer 1108 that carries out color reproduction with the toner of four colors of black (K) in the ink of four colors of yellow (Y), a Magenta (M), cyanogen (C), and black (K) differed is used.

[0013] And color matching is independently performed for every [each printer 1108 and] 1110, respectively. Under the present circumstances, in this example, the display 1101 is calibrated to the color input signal. That is, the same chrominance signal as the signal currently outputted to a display 1101 is inputted into each printer driver. Add the following processings and each color patch of as many points in delivery and each color reproduction possible field as possible is printed to each printers 1108 and 1110. Next, the color difference with the color which actually carries out the colorimetry of this color patch sample, and should be displayed on the display 1101 of a color is computed, and the parameter of the color processing later mentioned so that this color difference may be reduced is changed.

[0014] The color processing shown in drawing 3 is actually 1 input gamma conversion (Input gamma conversion). : it is the function which amends the luminescence property of a CRT display.

2) Brightness concentration conversion (Brightness to density conversion) : it is the function for it to also be called LOG conversion and to change RGB brightness data into the YMC concentration data used by a printer etc.

[0015] 3) Black generation (Bleck generation) : in order to correct the color mixture black of Y+M+C, and the difference in K, extract a black component from the data of YMC generated by brightness concentration conversion.

4) Masking (Masking) : it is the function which amends the impure color component of subtractive primaries (YMC).

5) UCR (Under color removal) : it is the function which transposes the part of Y+M+C to K.

[0016] 6) Output gamma amendment (Output gamma correction) : it is the amendment function of the color reproduction relation between the input/output by color material, such as ink and a toner. For example, it amends that there is no relation to straight-line relation of OD (printing concentration) in the number of dots of ink (change with binary-ized processings mentioned later) etc.

7) Binary-ized processing (Digitaize) : various kinds of binary-ized approaches, such as a pattern dither method, an error diffusion method, and average concentration Conservation Act, are applicable.

[0017] The above activity is repeated and the parameter of each processings for color matching,

such as input gamma conversion, brightness concentration conversion, masking, UCR, output gamma amendment, and binary-izing, is decided. Since the display of a display is not directly used for color matching according to the above approach, Do not start the quality of the calibrating level of a display but call it the color which should be displayed. The observation data of the color patch sample by which the printout was carried out by the absolute value data and each printer of a virtual color will be compared. The color consistency which was very excellent also in the printer from which the color reproduction range also differs as a result by different recording method called the color laser beam printer 1108 and the color ink jet printer 1110 is acquired.

[0018] The ink jet printer shown in this example is raising the color reproduction property using the record approach called the so-called multi-scan. Thereby, the color reproduction range of a color ink jet printer can be made large, and color matching can be performed good. Next, the color ink jet printer 1110 shown in drawing 1 is explained below with reference to drawing 4 - drawing 16.

[0019] In drawing 4, the carriage 5 which carries out both-way migration is formed in right and left in accordance with the guide shafts 3 and 4 installed in this and parallel ahead of the platen 2 which backs up a sheet (recorded media, such as a record form and plastics sheet metal) 1. The recording head 6 which records an image on a sheet 1 according to record data is carried in this carriage 5. Let this recording head 6 be the ink jet head equipped with 64 nozzles by this example. It is fixed to the timing belt 10 wound around the pulley 8 by which a rotation drive is carried out by the carriage motor 7, and the follower pulley 9, and both-way migration of the carriage 5 is carried out by rotation of the carriage motor 7 in a main scanning direction (the direction of **** F). And record actuation is performed in each of the outward trip of this reciprocation, and a return trip.

[0020] A sheet 1 is supplied to the Records Department between a recording head 6 and a platen 2 with the sheet delivery roller (un-illustrating) by which is inserted along with the paper pan 11, and a rotation drive is carried out by the sheet delivery motor 12. The sheet 1 sent into this Records Department is stuck by the platen (fixed Taira platen) 2 with the sheet pressure plate 13. Paper is conveyed and delivered to the sheet 1 which passed through the Records Department with the delivery roller 14 and roller 15 by which a synchronous drive is carried out with a sheet delivery roller (un-illustrating).

[0021] The head recovery device 16 which consists of cap 17 and the ink suction means which it is stuck and isolated to the orifice side of a recording head 6 is formed in the home-position location set as the location which separated from the record range of a recording head 6. On the occasion of record, drive the expulsion-of-an-ink-droplet means of a recording head 6 with the scan to the main scanning direction of carriage 5 based on record data synchronizing with the signal outputted from the Rota linear coder 18 prepared in parallel with the guide shaft 4, the ink droplet discharged from the orifice inside a nozzle is made to adhere to a sheet 1, and the dot pattern is formed.

[0022] After record termination, a recording head 6 is stopped by the home location and the orifice side of a recording head 6 is sealed with the cap 17 of the ink recovery device 16.

Drawing 5 is the block diagram showing the outline configuration of the ink jet printer equipment of drawing 4. In drawing 5, it connects with the host computer 20 corresponding to the color picture processor of this example shown in drawing 1 through the record data receive section 22, and CPU (arithmetic and program control)21 of printer equipment is delivering and receiving the command data and alphabetic data from a host computer 20. RAM28 used as a work area of CPU21 is connected to this CPU21 including the control ROM 27 in which the control program and the various data of the timer 25 which regulates the timing of processing actuation, and the fonts ROM (CG-ROM)26 and CPU21 which have memorized the font of an alphabetic character or a notation are stored, a receive buffer, etc.

[0023] Command data and record data with which CPU21 is transmitted from a host computer 20 by this, Furthermore, it is based on various kinds of indication signals inputted through input port 29 from the various switch 30 grades prepared in the control panel. While controlling rotation of the carriage motor 7, the motor 12 for sheet delivery, etc. through an output port 31

and the motorised circuit 32 Record data are outputted to a recording head (ink jet head) 6 through the head control section 23 and the head mechanical component 24, and the record actuation is controlled.

[0024] Moreover, the timer 25 has generated the various time amount timing used for the excitation phase change of the carriage motor 7 and the motor 12 for sheet delivery etc. The output signal of the rotary encoder 18 used for determining the judgment of the scan location of a recording head 6 and the drive timing of a recording head 6 lets a detector 34 pass, and is fabricated by the direction signal a as shown by a of drawing 6, and b, and count pulse signal b. This direction signal a and the count pulse b are used as a rise down signal of an updown counter 401 shown in drawing 7 which it is inputted into the head control section 23, and is mentioned later, and which is mentioned later while being inputted into the location counter 35 which is an updown counter and being read into CPU21 as positional information of a recording head 6 through a register 36. Furthermore, the count pulse b is used as an interrupt signal of CPU21, and writes record data in the record data register 402 shown in drawing 7 by which CPU21 was formed in the head control section 23 by this interruption, and which is mentioned later.

[0025] Drawing 7 is the block diagram showing the configuration of the head control section 23 of the color ink jet printer 1110 of this example, the same number shows the part which is common on the above-mentioned drawing, and it omits those explanation. 101-116 are the registers which consisted of 16 16-bit flip-flops as shown in drawing 8. 16-bit data are set to each of these flip-flops 101-116 through a data bus from CPU21. ***** of 201-216 is a 1-bit selector (16 to 1). 1 bit data specified by the 4-bit selection signal 410 outputted from the 4-bit up/down counter 401 among 16 bit data inputted from each flip-flop are chosen, and it is outputting as output signals 301-316.

[0026] Physical relationship with the nozzle of a recording head 6 is shown in the relation between the selection signal 410 which is the output value of this counter 401, and 1 bit as which registers 101-116 are chosen, and a list at drawing 8. Moreover, the direction signal a and the count pulse b which are the output signal of the encoder appearance circuit 34 mentioned above as shown in drawing 6 are inputted into this up/down counter 401. And with migration of carriage 5, when the polarity of the direction signal a is high-level, "+1" of the counter 401 is carried out by the count pulse b, and when the direction signal a is a low level, "-1" of it is carried out by the count pulse b.

[0027] This count pulse b supports the drive timing of a recording head 9, and 1 to 1, and it is pulse width T set to the timer 403, and synchronizing with falling of the count pulse b, as shown in drawing 6, an enable signal 404 is outputted. At this time, the data which should be recorded are written in the 64-bit record data register 402 which consists of flip-flops etc. through the data bus from CPU21. The record data register 402 has two-step latch composition, and although it writes in the following data during the drive of a recording head 6, it is constituted so that it may have no effect on the drive of the current recording head 6.

[0028] The 64-bit output signal from the record data register 402 is inputted into AND circuits 501-564 for every bit, respectively, and each and the drive enable signal 404 of output signals 301-316 of data selectors 201-216 are inputted into each AND circuit. An enable signal 404 becomes high-level by this, and only the nozzle chosen by data selectors 201-216 can output the pulse signal for a head drive to the head mechanical component 24 according to the record data from the record data register 402.

[0029] Whenever the signal from an encoder 18 is inputted by having the above configuration (i.e., whenever the record location by the recording head 6 is switched), the output of the mask data memorized by flip-flops 101-116 is switched, and it becomes possible to develop and record a 16 bit x16 bit mask pattern on record space.

[0030] Drawing 9 is a flow chart which shows the control procedure in the color ink jet printer 1110 of this example, and explains actuation of the color ink jet printer 1110 based on this drawing below. The mask pattern first set as registers 101-116 in advance of this explanation is explained.

[0031] In the color ink jet printer 1110, as shown, for example in drawing 10, L division into equal

parts (the example of drawing 10 $L=4$, $L \geq 2$) of the nozzle of the recording head equipped with 64 nozzles is carried out, and recorded media are conveyed in the direction of vertical scanning by making the these-divided nozzle block into one unit. In this way, by carrying out the both-way scan of the recording head L times in a main scanning direction, the so-called multi-pass record which records the image of width of face (one band) recordable by part for one scan of a recording head is performed.

[0032] In drawing 10, 800 shows the time of record of an one-pass eye, and the recording head is located in this location. 801 shows a two pass eye and recorded media are conveyed by 16 nozzle width of face in the direction of vertical scanning at this time. Like the following, in 802, 3 pass eye and 803 show 4 pass eye, and 804 shows 5 pass eye. In order to record on the location where it differs on recorded media using a different nozzle for every pass at this time, it records preparing the repetition pattern which continues in the unit of a $M \times N$ dot (these Figs. 16×16) for every record pass, and covering a mask over record data for every record pass, as shown in drawing 11 - drawing 14. Drawing 11 shows the pattern of an one-pass eye, in drawing 12, the pattern of a two pass eye and drawing 13 show the pattern of 3 pass eye, and drawing 14 shows the pattern of 4 pass eye, respectively. In addition, in drawing 11 - drawing 14, when record data are in the location of a black dot, ink is breathed out from a corresponding nozzle, even if record data exist, the mask of the regurgitation of ink is carried out and ink is not breathed out in the location of a white dot. Moreover, the size (value of M and N) of this repetition pattern differs in that optimum value from its mask pattern for every printer equipment and every recording mode.

[0033] Although the mask pattern set as registers 101-116 is a pattern shown in above-mentioned drawing 11 - drawing 14, record of 64 nozzle width of face by the recording head 6 is completed by four horizontal scanning using each of these mask patterns. In the pattern of these drawing 11 - drawing 14, when record data are in the location of a black dot, the nozzle drives with record data and the nozzle does not drive irrespective of existence of record data and un-existing in a location without a black dot. That is, the mask of the drive of a recording head 6 will be carried out. In this way, after one scan by the recording head 6 is completed, a record form is conveyed in the direction of vertical scanning by 16 nozzles.

[0034] In the flow chart of drawing 9, initial setting of equipment is performed at step S101 after powering on of equipment. When carriage 6, i.e., a recording head, is in a home position at this time, the location counter 35 and an updown counter 401 are cleared to "0." After this, whenever the location counter 35 inputs the leading edge of the count pulse output signal b of a rotary encoder 18, it updates the counted value (location of a recording head 6), and shows the absolute location.

[0035] Moreover, this count pulse signal b is inputted into the updown counter 401, and changes record data and the mask pattern which takes an AND by changing the subdevice-bit location of data selectors 201-216 by switching that counted value. Moreover, in this initial setting, the time amount value which determines the driving pulse width of face of a recording head 6 is set to a timer 403.

[0036] And it waits to input a recording start instruction at step S102. If a recording start instruction is inputted at step S102, it will progress to step S103, and the mask pattern of the one-pass eye shown in registers 101-116 at drawing 11 is set. That is, "0F00" H is set to "F000" H and registers 109-112, and the pattern of "00F0" H is set to registers 101-104 at registers 113-116 at "000F" H and registers 105-108. In addition, "H" shows the hexadecimal here. Next, if it changes to constant speed and the value of the location counter 35 becomes a recording start location after progressing to step S104 and accelerating the carriage motor 7 to the predetermined rate which is in a recordable condition, CPU21 will be made into interrupt enable and record actuation will be started. Interrupt processing which an interrupt occurs in a record dot space and is shown with the flow chart of drawing 15 by this is performed.

[0037] At the interruption handling routine of drawing 15, the record data for 64 nozzles (a part for i.e., 4 word) are written in the record data register 402 at step S201. Since the counted value of an updown counter 401 switches whenever a record location switches here, the AND of the mask data chosen corresponding to this counted value and the output value of the record data

register 402 is taken, and this value is outputted to the head mechanical component 24 as an actual head driving pulse. And this routine will be ended and it will return to processing of drawing 9.

[0038] In this way, the data with which the AND of record data and a mask pattern was taken are outputted to a recording head 6, and record is performed. After record for one scan by this recording head 6 is completed, it progresses to step S105 of drawing 9, and interruption is made disenabled, and the die-length part recording paper equivalent to the recording width for 16 nozzles is conveyed. Henceforth, at the steps S106-S114 as well as steps S103-S105 of an one-pass eye, the mask pattern (drawing 12 - drawing 14) corresponding to each pass is set to registers 101-116, and record actuation is performed. In this way, all the records for four pass are completed, and if record of 64 nozzle width of face is completed, it will wait for the input of return and the next recording start directions to step S102.

[0039] An advantage as mitigated the burden of software, and covered over which and recorded a mask on record data with a 16x16-bit mask pattern for every scan of a recording head 6 with an easy configuration and shown below by the above control is acquired.

(1) The high definition record in which white **** and ***** are not conspicuous is attained.

(2) Since the imprint consistency of the ink in one scan can be fallen, fixable [of the ink to a regular paper] is improved.

(3) Since mask registers 101-116 are rewritten for every one scan of a recording head, record location gap amendment at the time of both-way record can be performed easily.

[0040] Therefore, a color reproduction property improves in this example, and affinity with color matching processing is good.

[0041] In addition, although the above-mentioned explanation explained the number of scans for using the number of nozzles of a recording head 6 as vertical 64 nozzle, and recording a part for 16x16 bits of nozzle width of face of a recording head 6 for the configuration of the mask pattern by mask registers 101-116 further as "4", it is clear that it can carry out also for the numeric value except said. Moreover, although the signal which switches the mask data outputted from mask registers 101-116 was made into the counted value of the up/down counter 401 updated based on the signal outputted from a rotary encoder 18 in the above-mentioned explanation, this counter 401 may update that counted value with the signal from the linear encoder arranged in the not a signal but main scanning direction from a rotary encoder 18, or may output a trigger signal to a counter 401 directly from CPU21.

[0042] Moreover, although CPU21 performed the set of the record data to the record data register 402, this invention is not limited to this and may transmit the record data memorized by RAM28 using the DMA function to the direct record data register 402. Next, other examples of a configuration of the ink jet printer explained above are explained below.

[0043] Drawing 16 and drawing 17 are flow charts which show other examples of control in the ink jet printer of this example. It shall consider as the ink jet printer equipment in which color record is possible, and recording head 6a shall be constituted from the following examples of control by yellow, a Magenta, cyanogen, and 4 color head of black. It is the configuration which can change the mask pattern which prepares the mask register which consists of 16 bit x16 bits which memorizes a mask pattern for every color in this example, and is used by one scan for every color. Although especially this configuration is not illustrated, if it explains based on the configuration of the head control section 23 of drawing 7, the updown counter 401 which chooses the applicable bit of a mask pattern will presuppose that it is common to four colors, and will form the other selectors 201-216 for mask selection, the record data register 402, and the timer 403 that determines head driving pulse width of face for every color. That is, the mask register for blacks is explained below, using [the mask register for 101-116, and cyanogen] the mask register for 141-156, and yellow as 160-176 for the mask register for 121-136, and Magentas. In addition, the configuration of the mask register of each color is the same as that of drawing 8 shown in the above-mentioned example. Moreover, since it is as common as the above-mentioned example except the configuration of the head control section 23, those explanation is omitted.

[0044] In the flow chart of drawing 16, initial setting of equipment is performed at step S301

after powering on of equipment. Like the example of this time above-mentioned, when a recording head 6 is in a home position, the location counter 35 and an updown counter 401 are cleared. Moreover, it sets to the timer (403) which was able to establish the time amount value which determines the driving pulse width of face of a recording head 6 at this time for every color, respectively. Next, it progresses to step S302, if a recording start instruction is inputted, it will progress to step S303, and the mask pattern (not shown) of an one-pass eye which is different for every color in register 101-116, 121-136, 141-156, 160-176 is set. Next, it progresses to step S304 and accelerates to the predetermined rate which can record the carriage motor 7, if the value of the location counter 35 becomes a record location, it will change to a constant speed drive, and CPU21 is made into interrupt enable, and record actuation is performed.

[0045] In the interruption routine of drawing 17, the record data for 64 nozzles (i.e., a total of 4 word x4 classification by color) are written in the record data register (402) prepared for every color at step S401. In this way, whenever a record location switches, it is updated, the AND of the mask data for every color which this counted value shows, and the output value of the record data register (402) corresponding to each color is taken, and the counted value of an updown counter 401 is outputted to the head mechanical component 24 as a head driving pulse for every color. In this way, after record of 1 scan is completed, it progresses to step S305, and interruption is made disenabled, and only the die length according to the recording width for 16 nozzles conveys the recording paper.

[0046] Henceforth, a mask pattern which differ for every pass and is different for every color before scan initiation of each pass at steps S306-S314 like record actuation of the one-pass eye of steps S303-S305 and which is not illustrated is set to register 101-116, 121-136, 141-156, 160-176, and record actuation is performed. In this way, all records for four pass are completed, and if the color picture for each color 64 nozzle width of face is recorded, it will wait for return and recording start directions of next Rhine to step S302.

[0047] By the above control, the burden of software can be lessened and record over which the mask of different 16x16 bitwise for every color was covered can be performed for every scan. Thereby, since the fixing sequence to the recording paper of (1) each color is changeable, rationalization of tone is measured.

(2) Since the consistency of the ink which adheres in the record paper in one scan which becomes a problem especially by color record can be fallen, fixable [of the ink to recorded media, such as a regular paper,] is improved.

(3) An irregular color is improved.

The printer equipment in which record at high density and high speed with the advantage to say is possible can be offered.

[0048] Especially by the above explanation, also in the ink jet recording method, the flight-drop was formed using heat energy and it explained taking the case of the recording head of the ink jet method which records, and the recording device. About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by 1 to 1 as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If the shape of a pulse form is carried out, since growth contraction of air bubbles will be appropriately performed instancy in this driving signal, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable.

[0049] As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, outstanding record

can be performed if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted. It is good also as a configuration using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the configuration arranged to the field to which a delivery which is indicated by each above-mentioned specification, a liquid route, and the heat operating surface other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of an electric thermal-conversion object are crooked as a configuration of a recording head.

[0050] In addition, it can also consider as the configuration based on JP,59-138461,A which indicates the configuration whose opening which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object, or heat energy is made to correspond to a discharge part to two or more electric thermal-conversion objects. Furthermore, any of the configuration which fills the die length with the combination of two or more recording heads which are indicated by the specification mentioned above as a recording head of the full line type which has the die length corresponding to the width of face of the maximum record medium which can record a recording device, and the configuration as one recording head formed in one are sufficient.

[0051] In addition, the recording head of the exchangeable chip type with which the electric connection with the body of equipment and supply of the ink from the body of equipment are attained, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one may be used by the body of equipment being equipped. Moreover, since effectiveness of this invention is further made to stability, it is desirable to add the recovery means against a recording head established as a configuration of the recording device of this invention, a preliminary auxiliary means, etc. If these are mentioned concretely, it is effective in order to perform record stabilized by performing the preheating means by the capping means, the cleaning means, the pressurization or the suction means, the electric thermal-conversion object, the heating elements different from this, or such combination over a recording head, and auxiliary discharge appearance mode in which the regurgitation different from record is performed.

[0052] Furthermore, by constituting not only the recording mode of only mainstream colors, such as black, but a recording head in one as a recording mode of a recording device, even with two or more combination, although it is good, it can also consider as equipment equipped with full color at least one by the double color color of a different color, or color mixture. In this invention example explained above, although ink is explained as a liquid The thing which is ink solidified less than [a room temperature or it], and is softened at a room temperature, or the thing which is a liquid, Or by the above-mentioned ink jet method, since what carries out temperature control is common as a temperature control is performed for ink itself by within the limits below 70-degreeC more than 30-degreeC and it is in the stabilization regurgitation range about the viscosity of ink, ink should just make the shape of liquid at the time of use record signal grant.

[0053] In addition, it carries out whether the ink which prevents by making the temperature up by heat energy use it positively as energy of the change of state from a solid condition to the liquid condition of ink, or is solidified in the state of neglect for the purpose of antilashing of ink is used. Anyway, ink liquefies by grant according to the record signal of heat energy. Use of the ink of the property which will not be liquefied without heat energy, such as what carries out the regurgitation as liquefied ink, and a thing which it already begins to solidify when reaching a record medium, is also applicable to this invention. In such a case, ink is good for a porosity sheet crevice or a through tube which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the condition of having been held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0054] Furthermore, in addition, as a gestalt of the recording device concerning this invention, although prepared in one or another object as an image printing terminal of information management systems, such as the above word processors and a computer, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a

transceiver function further may be taken. It returns to explanation of drawing 1 – drawing 3 again. It constitutes so that two or more color matching processings can be partially applied to coincidence to graphics in the configuration of drawing 2. That is, there are two image datas from the respectively separate source, for example in one graphic, and in one kind of color matching processing, when it is difficult to reproduce the color of each image data, the color reproduction of a wish can be obtained by applying separate color matching processing.

[0055] For example, as these separate sources, one side has the color scanner which reads a manuscript etc. and is changed into a color picture signal, and has computer images, such as another side and computer GURAFUKKUSU.

[0056] In the application holding graphical data, a CMM attribute is added as an attribute of a drawing object. A CMM attribute is a thing for specifying the color matching processing chosen in case the object is outputted to a printer. In case it outputs to a printer, a CMM attribute is attached to the data of an object from application, and data are transmitted. Graphical data is changed by the color matching processing facility beforehand included in the device driver of a printer, or the printer, and a printout is carried out from a printer.

[0057] the following and drawing 18 — therefore, color information processing of this example is explained to a detail. In application 1103, graphical data is managed for every object. To an image, it has a location, magnitude, and a Cmm attribute other than bit map information. This Cmm attribute is data for identifying a color matching algorithm uniquely, for example, is a character string. In the application 1103 of this example, each image is chosen and a Cmm attribute is set up. For example, Cmm1 is set as an image 1 and Cmm2 is set as an image 2.

[0058] The optimal algorithm is chosen in order that these [Cmm1 and Cmm2] may compress each color range of an image 1 and an image 2 according to the color reproduction range of a printer.

[0059] If initiation is directed at the time of the output to a printer, OS1102 will perform processing of drawing 18. That is, the CMS initiation command which considers as print initiation at step S500, and starts color management processing of a Color Management System (CMS) first at continuing step S501 is sent out to a corresponding printer driver and a corresponding printer. And it investigates whether there is any selection object which should be processed at step S502. When there is an object which should be printed here, the Cmm attribute which was progressed and mentioned above and which is added to the object data concerned with application 1103 like is investigated to step S503, and the optimal matching algorithm is chosen as it. For example, in the example of drawing 1, since an image 1 will be processed at first, Cmm1 will be chosen.

[0060] Matching by the algorithm which it means that the optimal matching algorithm was chosen by this, and was chosen at continuing step S504 is started. And drawing processing of the image chosen as shown in step S505 is performed. First in the example of drawing 1, an image 1 is drawn. And the matching processing according to the matching algorithm chosen as shown in step S506 is ended, and it returns to step S502. The following object is chosen at step S502. In the example of drawing 1, an image 2 is chosen next. And it progresses to step S503 again, the Cmm attribute added to the object data concerned is investigated, and the optimal matching algorithm is chosen. For example, in the example of drawing 1, since an image 2 will next be processed, Cmm2 will be chosen.

[0061] Matching by the algorithm which it means that the optimal matching algorithm was chosen by this, and was chosen at continuing step S504 is started. And drawing processing of the image chosen as shown in step S505 is performed. In the example of drawing 1, an image 2 is drawn next. And the matching processing according to the matching algorithm chosen as shown in step S506 is ended, and it returns to step S502. The following object is chosen at step S502. In the example of drawing 1, since there is no following object, it progresses to step S510. When there is the following selection object further here, it shifts to step S503 again, and processing to the following object is performed.

[0062] In step S503, a CMS quit command is outputted to a corresponding printer driver and a corresponding printer, and print processing is ended at step S511. OS1102 terminates the processing concerned. A printer driver performs matching processing in the above explanation,

and the image data of the result by which matching processing was carried out is sent to a printer. In addition, printer drivers 1106 and 1109 compensate the color reproduction property of the color laser beam printer 1108 and the color ink jet printer 1110, respectively, and matching processing whose color reproduction of the print outputted with the color laser beam printer 1108 and the color ink jet printer 1110 corresponds is set up beforehand.

[0063] When [which was explained above] two or more image datas are during the graphic output of one sheet like according to this example, processing by another color matching algorithm can be applied for every image. for example, natural drawing and CG data -- as -- although a beautiful output was not able to be obtained by the former to the graphic containing the image data of a different class since only one color matching algorithm was applicable, according to this example, it can be alike, respectively, it can receive, a suitable color matching algorithm can be chosen, and a beautiful output can be obtained.

[0064] In addition, even if it applies this invention to the system which consists of two or more devices, it may be applied to the equipment which consists of one device. Moreover, it cannot be overemphasized that this invention can be applied also when attained by supplying a program to a system or equipment.

[0065]

[Effect of the Invention] According to this invention, the optimal color matching processing corresponding to the output color reproduction property in the output means in the color matching processing facility which it had can be performed and outputted like by attaching image attribute information to the data which should be outputted in case [at which it explained above] it outputs from an output means.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing explaining color matching for every object of one example concerning this invention.

[Drawing 2] It is the functional block diagram showing the configuration of this example.

[Drawing 3] It is drawing explaining processing and data flow of this example.

[Drawing 4] It is the external view showing the configuration of the Records Department of the ink jet printer of this example.

[Drawing 5] It is the block diagram showing the configuration of the ink jet printer of this example.

[Drawing 6] It is drawing showing the detecting signal and the example of a head driving pulse of a linear encoder in the ink jet printer of this example.

[Drawing 7] It is the block diagram showing the configuration of the head control section of the ink jet printer of this example.

[Drawing 8] It is drawing for explaining the mask pattern used with the ink jet printer of this example.

[Drawing 9] It is the flow chart which shows the example of operation in the ink jet printer of this example.

[Drawing 10] It is drawing for explaining migration of the recording head at the time of 4 pass records adopted with the ink jet printer of this example.

[Drawing 11] It is drawing showing an example of the mask pattern of the one-pass eye in the ink jet printer of this example.

[Drawing 12] It is drawing showing an example of the mask pattern of the two pass eye in the ink jet printer of this example.

[Drawing 13] It is drawing showing an example of the mask pattern of 3 pass eye in the ink jet printer of this example.

[Drawing 14] It is drawing showing an example of the mask pattern of 4 pass eye in the ink jet printer of this example.

[Drawing 15] It is the flow chart which shows interrupt processing in the ink jet printer of this example.

[Drawing 16] It is the flow chart which shows other examples of operation in the ink jet printer of this example.

[Drawing 17] It is the flow chart which shows interrupt processing of other examples of operation in the ink jet printer of this example.

[Drawing 18] It is a flow chart for explaining the image processing of this example.

[Drawing 19] It is drawing explaining the conventional color matching.

[Description of Notations]

1 Record Sheet

5 Carriage

6 Recording Head

7 Carriage Motor

18 Rotary Encoder

21 CPU

23 Head Control Section

24 Head Mechanical Component

27 Control ROM

35 Location Counter

101-116 Mask register

230 Head DMA Control Section

231 DMA Control Section

401 Updown Counter

402 Record Data Register

1101 Display

1102 OS

1103 Application

1104 Object Data

1105 CMM Attribute

1106 1109 Printer driver

1107 Color Matching Processing Section

1108 Color Laser Beam Printer

1110 Color Ink Jet Printer

[Translation done.]

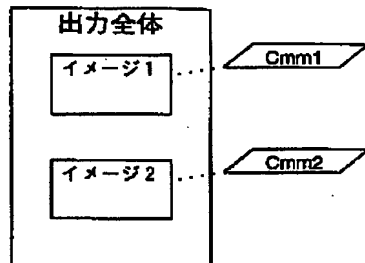
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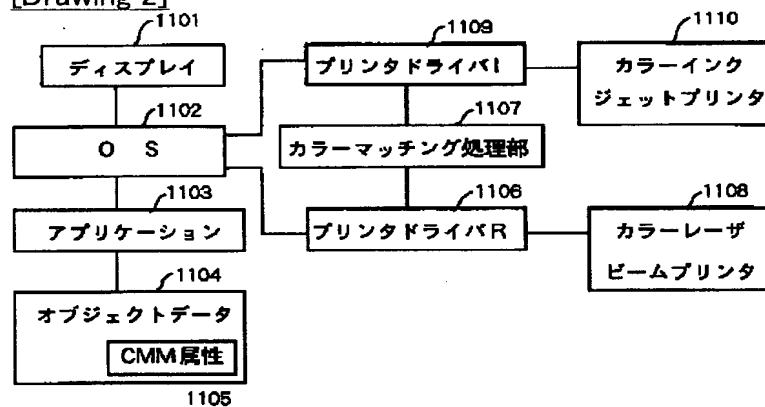
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DRAWINGS

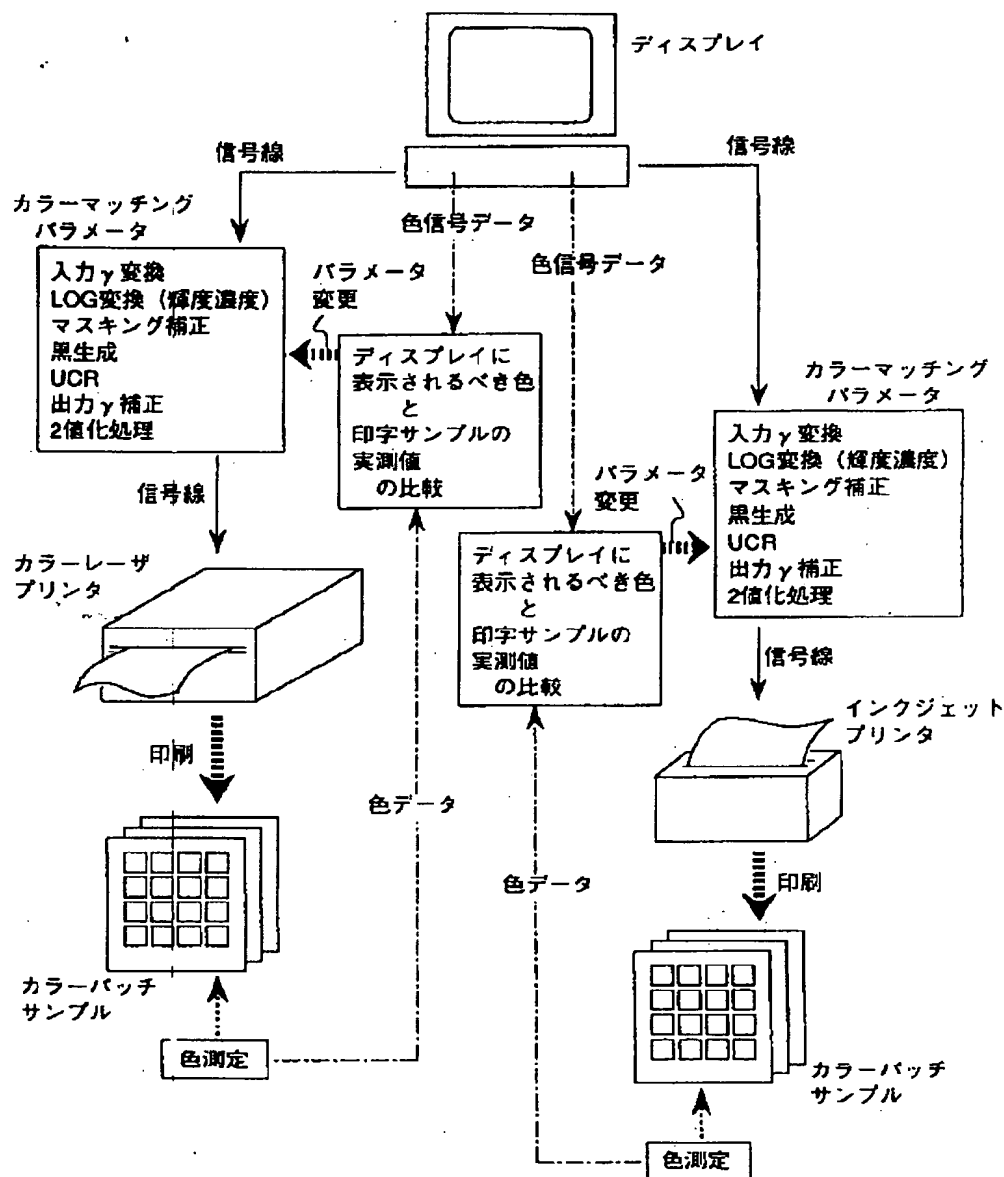
[Drawing 1]



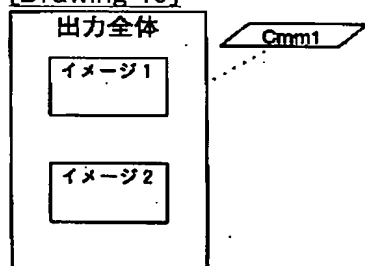
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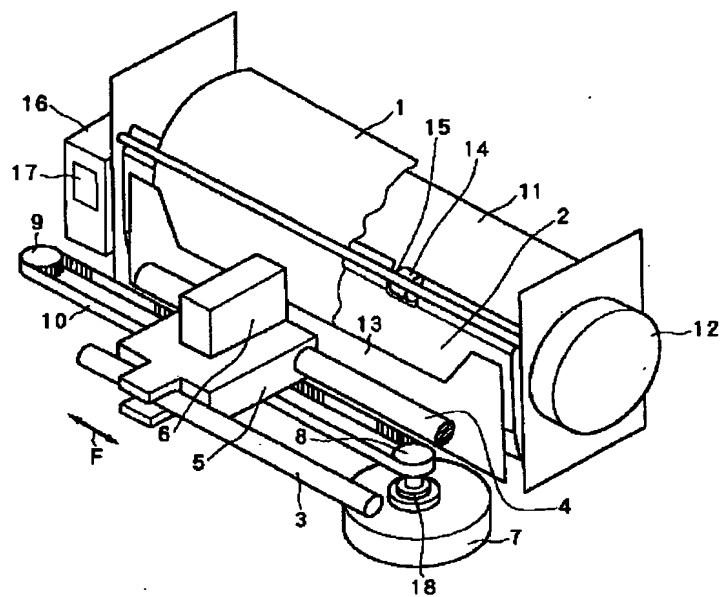
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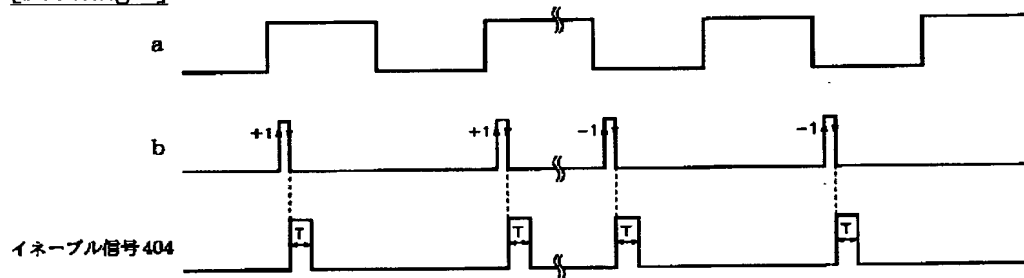
[Drawing 19]



[Drawing 4]



[Drawing 6]

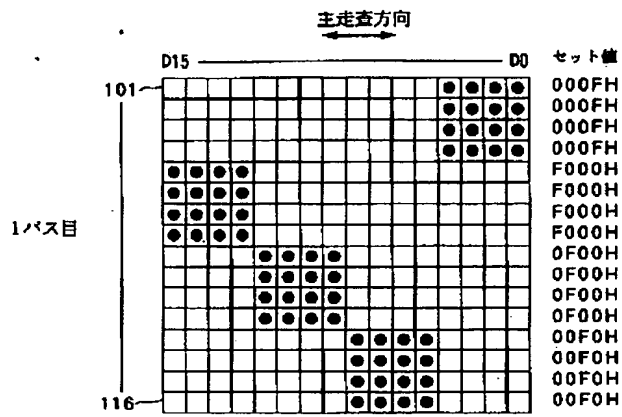


[Drawing 8]

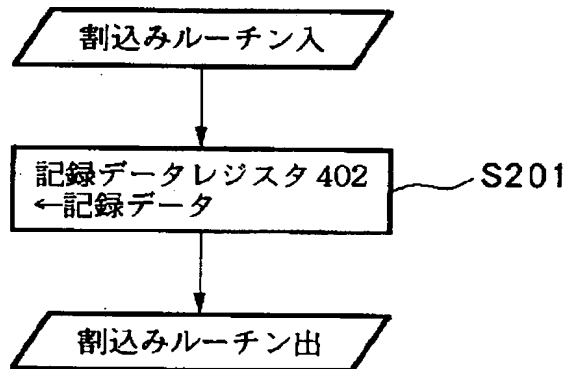
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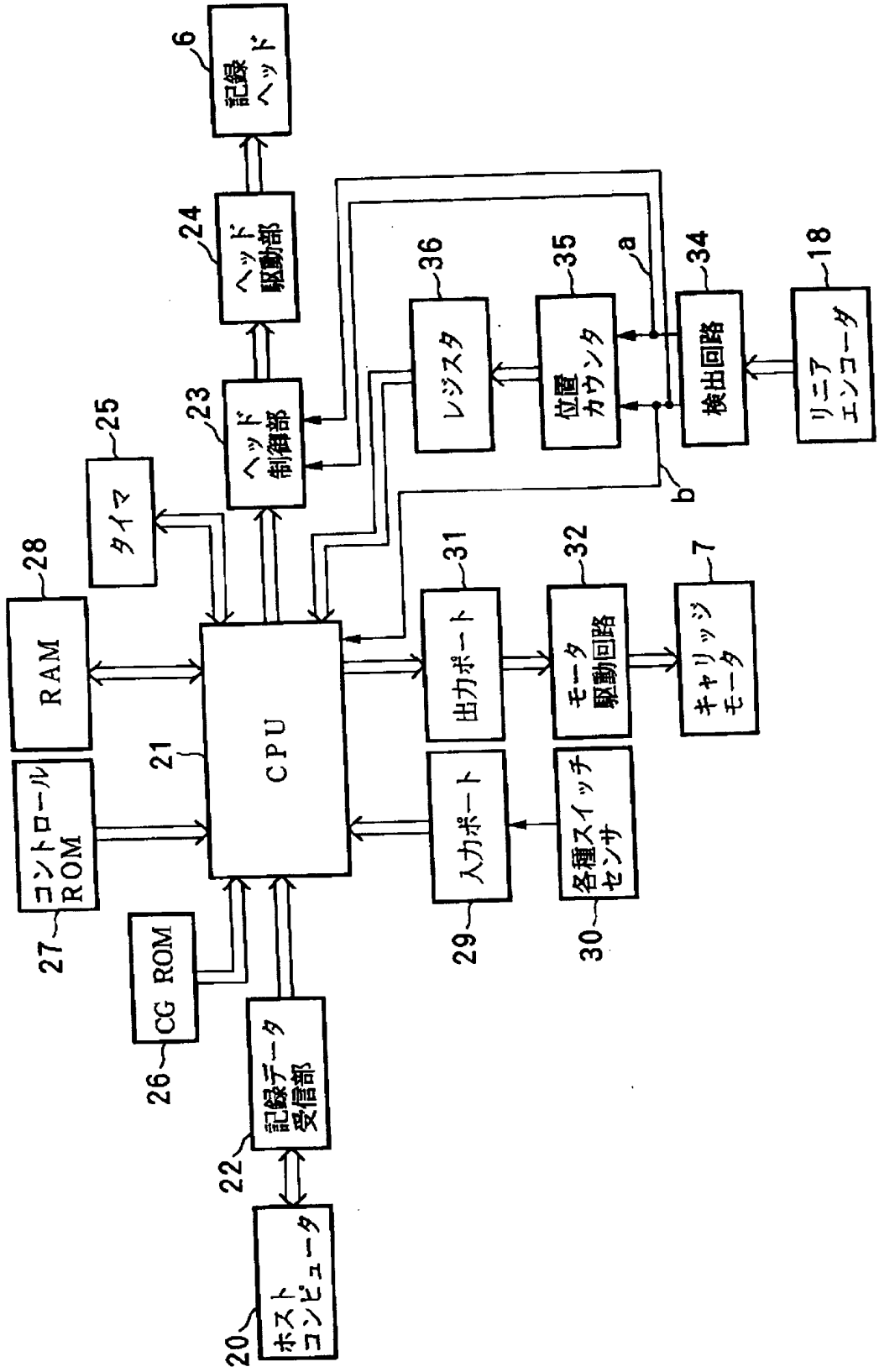
[Drawing 11]



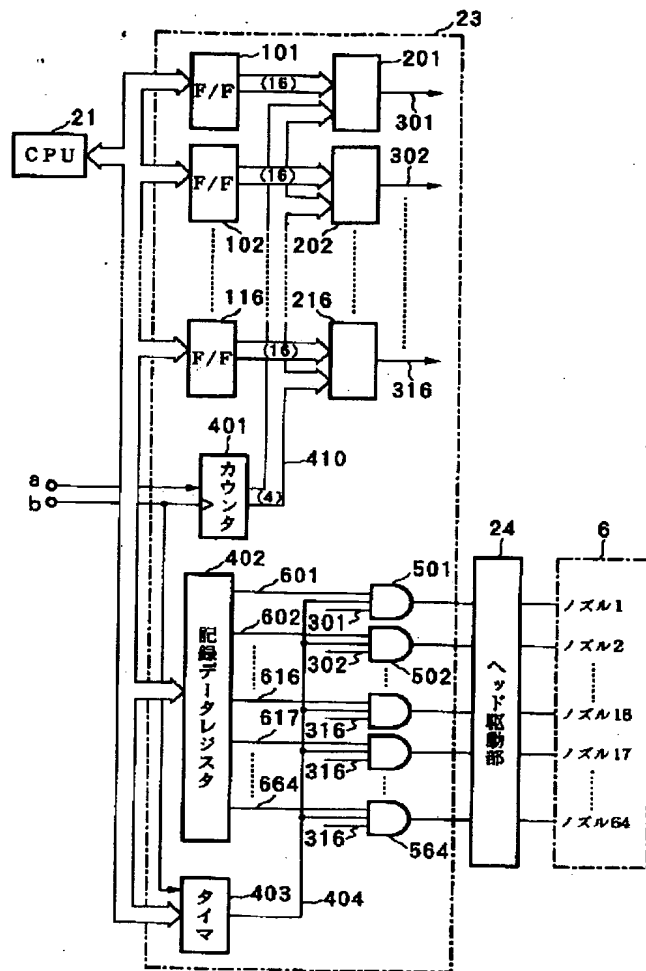
[Drawing 15]



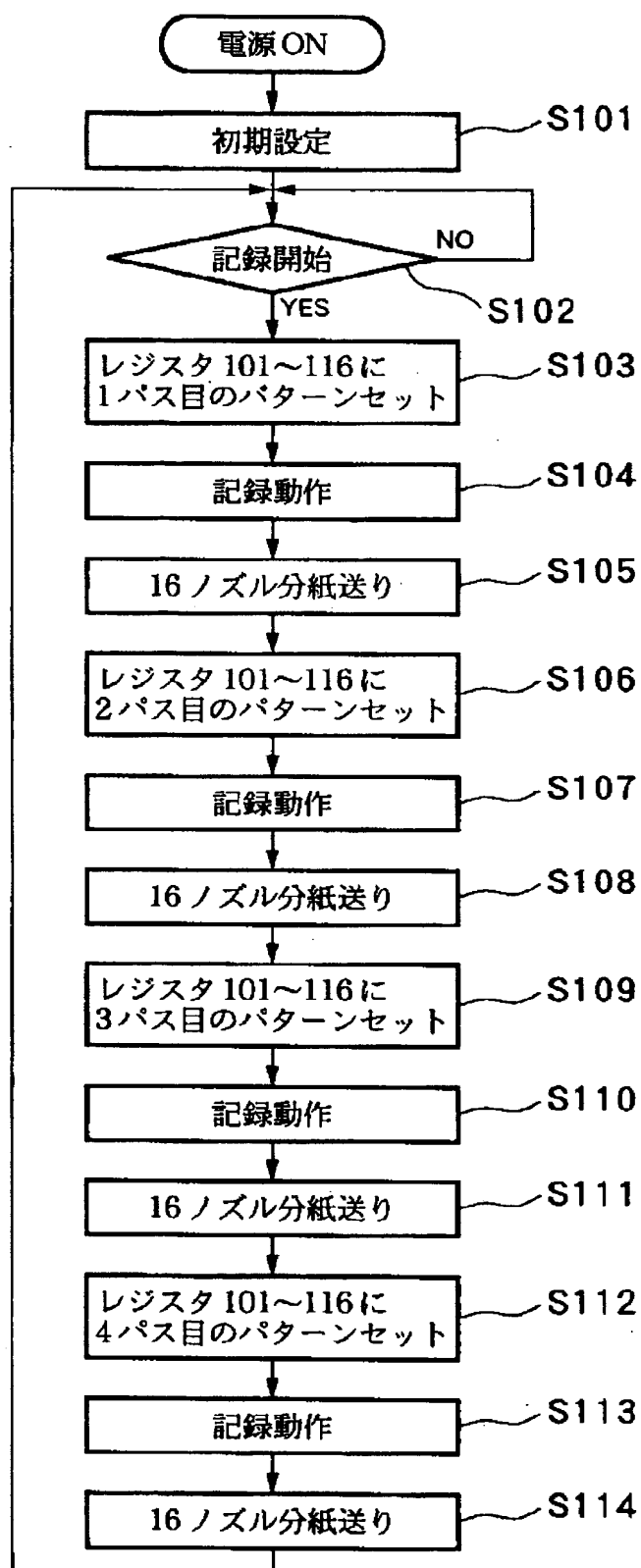
[Drawing 5]



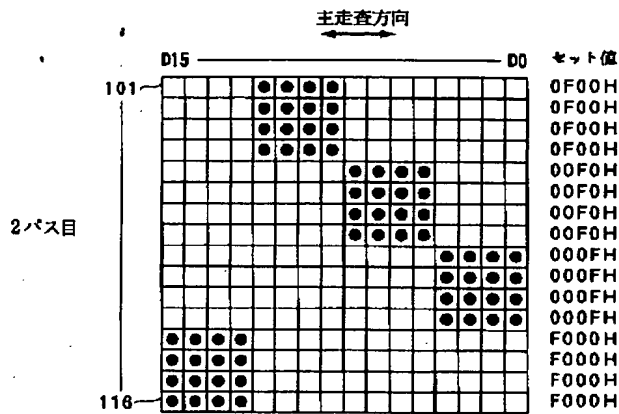
[Drawing 7]



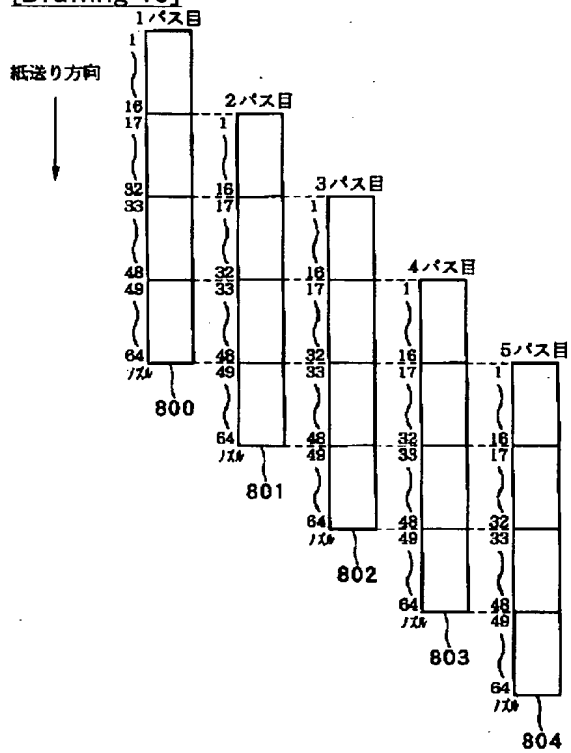
[Drawing 9]



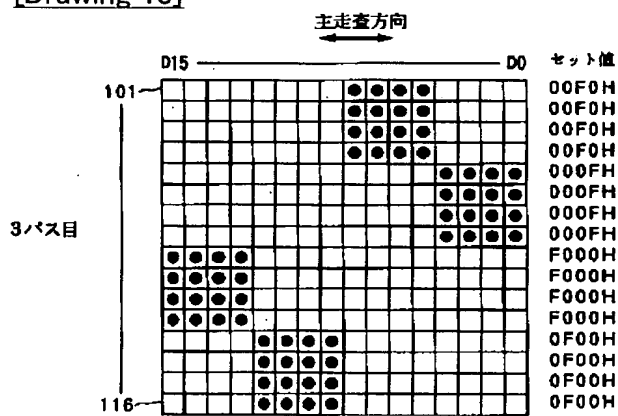
[Drawing 12]



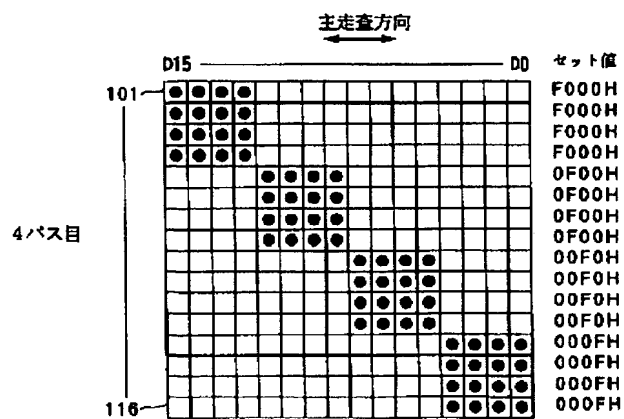
[Drawing 10]



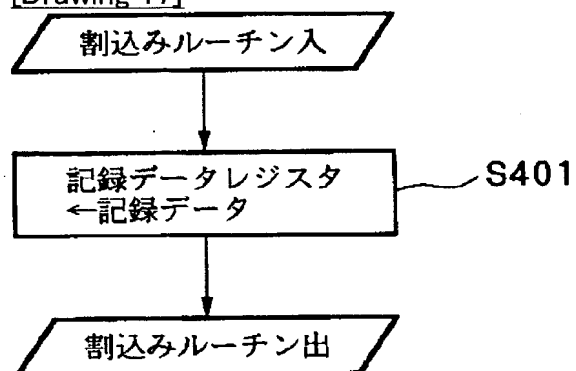
[Drawing 13]



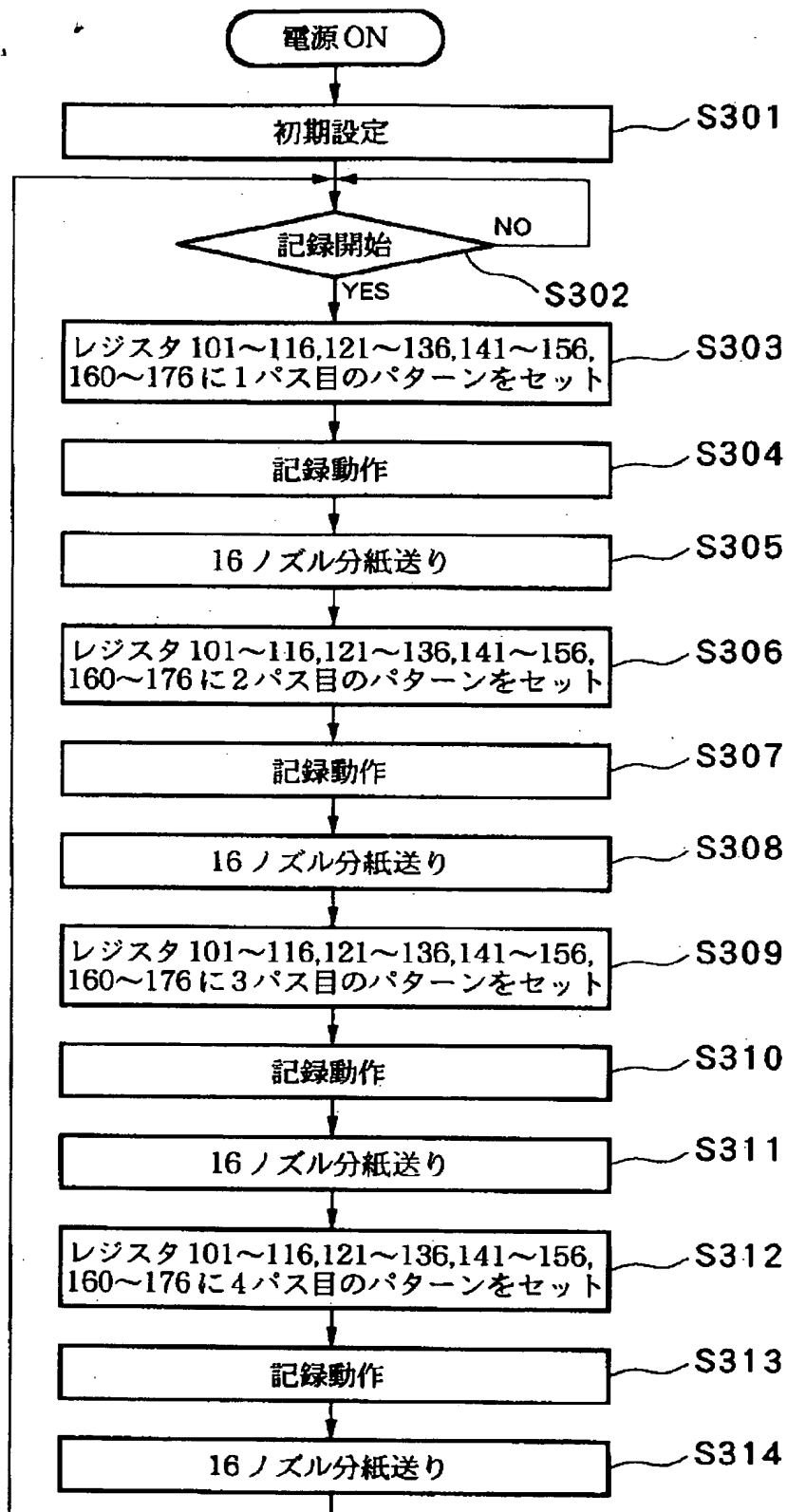
[Drawing 14]



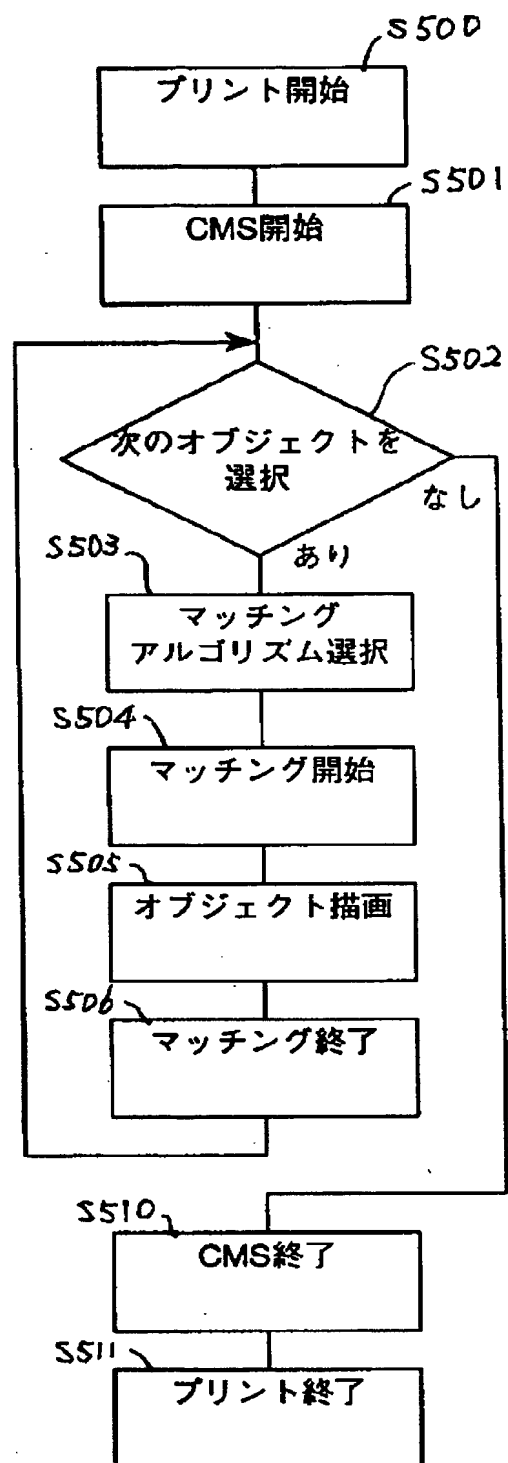
[Drawing 17]



[Drawing 16]



[Drawing 18]



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